

WHAT IS CLAIMED IS:

1. A built-up type toy having a plurality of parts 10a of polyhedron shape equipped with joining surfaces 11a that are joined with other joining surfaces 11b of other parts 10b, the built-up type toy
5 comprising the parts respectively having magnet portions 100a on the joining surfaces 11a thereof, wherein the magnet portion 100a of the part 10a and the magnet portion 100b on the joining surfaces 11b of the parts 10b are joined with each other by magnetic force thereof.
- 10 2. The built-up type toy of claim 1, wherein the magnet portion 100 is formed on a central area of the joining surface 11 of the part 10.
3. The built-up type toy of claim 1, wherein a plurality of magnet portions 100 are provided on the respective joining surfaces 11 of the part
15 10.
4. The built-up type toy of claim 2, wherein the magnet portion 100 is provided on all of the surfaces 11 of the part 10.
- 20 5. The built-up type toy of claim 1, wherein the parts 10a form a character, a number, a symbol, a diagram, or a certain shape on a plane thereof as the parts 10a are joined with other parts 10b.
6. The built-up type toy of claim 1, wherein the parts 10 are
25 comprised of a plurality of hexahedrons having shapes and sizes identical to each other.

7. The built-up type toy of claim 6, wherein the part 10 comprises:

a central part 10c having a circular transverse section and having a plurality of magnet portions 100 arranged on an outer surface thereof at a predetermined interval; and

a plurality of fragmental parts 10d and 10e having a fan-shaped transverse section, the fragmental parts 10d and 10e respectively having a magnet portion 100d1 corresponding to the magnet portion 100c on the outer surface of the central part 10c, and magnet portions 100d2 being joined with the magnet portions 100e2 of other fragmental parts 10e on both side thereof,

wherein a cylindrical shape is formed as the central part 10c is located on a central position and inner surfaces of the plurality of fragmental parts 10d and 10e are joined on the outer surface of the central part 10c.

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8. The built-up type toy of claim 1, wherein the parts 10a realize a variety of three-dimensional shapes as being joined with other parts 10b.

9. The built-up type toy of claim 8, wherein the magnet portion 100 is formed on an edge area of the joining surfaces 11 of the part 10.

10. The built-up type toy of claim 8, wherein a plurality of magnet portions 100 are formed on each of the surface 11 of the part 10.

11. The built-up type toy of claim 10, wherein the magnet portions 100 are formed on all of the joining surfaces 11 of the part 10.

12. The built-up type toy of claim 8, wherein the parts 10 comprise:

a rotational shaft part 10f having a shape of a bar and formed with the magnet portions 100 on both ends thereof; and

5 a wheel part 10g formed with the magnet portion 100g joined with the magnet portion 100f of the rotational shaft part 10f on a central area thereof.

13. The built-up type toy of claim 8, wherein the parts 10
10 comprise:

a fragmental part 10h having a detached shape achieved by detaching a section from an overall shape of joined product; and

a body part 10i having a residuary shape achieved by detaching the fragmental parts 10h from the overall shape of the joined product.

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14. A built-up type toy having a plurality of parts 10a of polyhedron shape equipped with joining surfaces 11a that are joined with other joining surfaces 11b of other parts 10b, the built-up type toy comprising:

20 the parts respectively having magnet portions 100a on the joining surfaces 11a thereof;

wherein the magnet portion 100a of the part 10a and the magnet portion 100b on the joining surface 11b of the parts 10b are joined with each other by magnetic force thereof,

25 and wherein the magnet portion 100 comprises:

a magnet 110 of which both magnetic poles are arranged to face directions different from each other, the magnet 110 being installed on a

magnet installation recess 120 formed on the part 10; and

a separation preventing means 200 for preventing a separation of the magnet 110 from the magnet installation recess 120 while allowing a rotation of the magnet 110 in the inner space of the magnet installation
5 recess 120.

15 15. The built-up type toy of claim 14, wherein the separation preventing means 200 comprises:

a rotational shaft 211 installed on a central area between both of the
10 magnetic poles of the magnet 110; and

a rotational shaft installation recess 212 formed on an inner surface of the magnet installation recess 120 so that the rotational shaft 211 is parallel with an outer surface of the part 10.

15 16. The built-up type toy of claim 15, wherein the magnet 110 is a permanent magnet 110a of cylindrical shape.

17. The built-up type toy of claim 14, wherein the separation preventing means 200 comprises:

20 a pair of recesses 221 formed on surfaces opposite to each other at a central area of both poles of the magnet 110; and

a pair of rotational shaft protrusions 222 formed on an inner surface of the magnet installation recess 120 so as to be inserted into the pair of recesses 221 while a virtual line connecting central positions of the pair of
25 recesses 221 to each other is in parallel with an outer surface of the part 10.

18. The built-up type toy of claim 17, wherein the magnet 110 is

a permanent magnet 110a of cylindrical shape.

19. The built-up type toy of claim 14, wherein the separation preventing means 200 has a hooking protrusion 231 for preventing the separation, which is formed on an opening of the magnet installation recess 120, and an inner diameter of the opening formed by the hooking protrusion 231 is narrower than a width and a length of the magnet 110.

20. The built-up type toy of claim 19, wherein the magnet 110 further comprises joining protrusions 232 on both magnetic poles thereof, of which an outer diameter is smaller than the inner diameter of the opening.

21. The built-up type toy of claim 20, wherein the magnet 110 is a permanent magnet 110a of cylindrical shape.

22. The built-up type toy of claim 14, wherein the separation preventing means 200 is a sealing lid 241 for closing the opening of the magnet installation recess 120.

23. The built-up type toy of claim 22, wherein a lid installation recess 242 is formed on a rim of the opening of the magnet installation recess 120, the lid installation recess 242 on which the sealing lid 241 is installed.

24. The built-up type toy of claim 23, wherein the magnet 110 is a cylindrical permanent magnet 110a or a spherical permanent magnet 110b.

25. The built-up type toy of claim 22, wherein the magnet installation recess 120 and the sealing lid 241 are formed integrally on the outer surface of the part 10, the magnet 110 is inserted after cutting the part 10, and the separation of the magnet 110 is prevented by attaching a cut
5 piece on the part 10.

26. The built-up type toy of claim 25, wherein the part 10 is made of wood.

10 27. The built-up type toy of claim 26, wherein the magnet 110 is a cylindrical permanent magnet 110a or a spherical permanent magnet 110b.

28. The built-up type toy of claim 14, wherein the separation preventing means 200 is a magnet installation member 200a inserted into
15 the magnet installation recess 120, the magnet installation member 200a comprising:

a circumferential portion 201 of which surface is in contact with the magnet installation recess 120; and

a lid portion 202 that closes an upper opening of the circumferential
20 portion 201.

29. The built-up type toy of claim 28, wherein the magnet 110 is a cylindrical permanent magnet 110a or a spherical permanent magnet 110b.

25 30. The built-up type toy of claim 28, wherein the magnet installation member 200a further comprises a means 250 for fixing the magnet installation member 200a into the magnet installation recess 120.

31. The built-up type toy of claim 30, wherein the magnet installation member fixing means 250 comprises a fixing wedge portion 251 extended downward of the circumferential portion 201 so as to be inserted
5 and fixed onto the bottom surface of the magnet installation recess 120.

32. The built-up type toy of claim 30, wherein the magnet installation member fixing means 250 comprises a hooking protrusion 252 formed outward on an outer surface of the circumferential portion 201
10 toward the lid portion 202.

33. The built-up type toy of claim 32, wherein the hooking protrusion 252 is an overall hooking protrusion 252a formed over all area of the outer surface of the circumferential portion 201 at a shape of a wedge.
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34. The built-up type toy of claim 32, wherein the hooking protrusion 252 is a partial hooking protrusion 252b formed on a partial area of the outer surface of the circumferential portion 201.

20 35. The built-up type toy of claim 34, wherein the partial hooking protrusion 252b is formed by cutting and bending a part of the circumferential portion 201.

36. The built-up type toy of claim 32, wherein the hooking
25 protrusion 252 is a lower hooking protrusion 252c formed on a lower end area of the outer surface of the circumferential portion 201.

37. The built-up type toy of claim 36, further comprising a tilted portion 253 that is tilted downward and inward from the lower hooking protrusion 252c at a certain degree.

5 38. The built-up type toy of claim 37, wherein the lower hooking protrusion 252c and the tilted portion 253 are formed integrally with each other by bending a lower portion of the circumferential portion 201.

39. The built-up type toy of claim 30, wherein the magnet
10 installation member fixing means 250 comprises a screw thread 254 formed on the outer surface of the circumferential portion 201.

40. The built-up type toy of claim 39, wherein the magnet
installation member fixing means 250 comprises a fixing tool insertion
15 recess 255 so formed on an upper surface of the lid portion 202 as to insert the magnet installation member 200a into the magnet installation recess 120 by rotating the magnet installation member 200a with a magnet installation member fixing tool 260.

20 41. The built-up type toy of claim 40, wherein the fixing tool insertion recess 255 is an insertion recess 255a having a circular transverse section.

42. The built-up type toy of claim 41, wherein a plurality of
25 insertion recesses 255a having the circular transverse section are formed in a radial fashion.

43. The built-up type toy of claim 40, wherein the fixing tool insertion recess 255 is an insertion recess 255b having a cross-shaped transverse section.

5 44. The built-up type toy of any one of claims 14 to 43, wherein the magnet portion 100 is formed on a central area of the joining surface 11 of the part 10.

10 45. The built-up type toy of any one of claims 14 to 43, wherein a plurality of magnet portions 100 are formed on each joining surface 11 of the part 10.

15 46. The built-up type toy of claim 45, wherein the magnet portions 100 are formed all of the joining surfaces 11 of the part 10.

 47. The built-up type toy of any one of claims 14 to 43, wherein the parts 10a form a character, a number, a symbol, a diagram, or a certain shape on a plane thereof as the parts 10a are joined with other parts 10b.

20 48. The built-up type toy of any one of claims 14 to 43, wherein the parts 10 are comprised of a plurality of hexahedrons having shapes and sizes identical to each other.

25 49. The built-up type toy of claim 48, wherein the part 10 comprises:

 a central part 10c having a circular transverse section and having a plurality of magnet portions 100 arranged on an outer surface thereof at a

predetermined interval; and

a plurality of fragmental parts 10d and 10e having a fan-shaped transverse section, the fragmental parts 10d and 10e respectively having a magnet portion 100d1 corresponding to the magnet portion 100c on the outer surface of the central part 10c, and magnet portions 100d2 being
5 joined with the magnet portions 100e2 of other fragmental parts 10e on both side thereof,

wherein a cylindrical shape is formed as the central part 10c is located on a central position and inner surfaces of the plurality of fragmental
10 parts 10d and 10e are joined on the outer surface of the central part 10c.

50. The built-up type toy of any one of claims 14 to 43, wherein the parts 10a realize a variety of three-dimensional shapes as being joined with other parts 10b.
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51. The built-up type toy of claim 50, wherein the magnet portion 100 is formed on an edge area of the joining surfaces 11 of the part 10.

52. The built-up type toy of claim 50, wherein a plurality of
20 magnet portions 100 are formed on each of the surface 11 of the part 10.

53. The built-up type toy of claim 52, wherein the magnet portions 100 are formed on all of the joining surfaces 11 of the part 10.

54. The built-up type toy of claim 50, wherein the parts 10
25 comprise:

a rotational shaft part 10f having a shape of a bar and formed with

the magnet portions 100 on both ends thereof; and

a wheel part 10g formed with the magnet portion 100g joined with the magnet portion 100f of the rotational shaft part 10f on a central area thereof.

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55. The built-up type toy of claim 50, wherein the parts 10 comprise:

a fragmental part 10h having a detached shape achieved by detaching a section from an overall shape of joined product; and

10 a body part 10i having a residuary shape achieved by detaching the fragmental parts 10h from the overall shape of the joined product.

56. A joining apparatus with rotatable magnet comprising:

15 a magnet 110 of which both magnetic poles are arranged to face directions different from each other, the magnet 110 being installed on a magnet installation recess 120 formed on the part 10; and

a separation preventing means 200 for preventing a separation of the magnet 110 from the magnet installation recess 120 while allowing a rotation of the magnet 110 in the inner space of the magnet installation
20 recess 120.

57. The joining apparatus with rotatable magnet of claim 56, wherein the separation preventing means 200 comprises:

25 a rotational shaft 211 installed on a central area between both of the magnetic poles of the magnet 110; and

a rotational shaft installation recess 212 formed on an inner surface of the magnet installation recess 120 so that the rotational shaft 211 is

parallel with an outer surface of the part 10.

58. The joining apparatus with rotatable magnet of claim 57, wherein the magnet 110 is a permanent magnet 110a of cylindrical shape.

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59. The joining apparatus with rotatable magnet of claim 56, wherein the separation preventing means 200 comprises:

a pair of recesses 221 formed on surfaces opposite to each other at a central area of both poles of the magnet 110; and

10 a pair of rotational shaft protrusions 222 formed on an inner surface of the magnet installation recess 120 so as to be inserted into the pair of recesses 221 while a virtual line connecting central positions of the pair of recesses 221 to each other is in parallel with an outer surface of the part 10.

15 60. The joining apparatus with rotatable magnet of claim 59, wherein the magnet 110 is a permanent magnet 110a of cylindrical shape.

61. The joining apparatus with rotatable magnet of claim 56, wherein the separation preventing means 200 has a hooking protrusion 231
20 for preventing the separation, which is formed on an opening of the magnet installation recess 120, and an inner diameter of the opening formed by the hooking protrusion 231 is narrower than a width and a length of the magnet 110.

25 62. The joining apparatus with rotatable magnet of claim 61, wherein the magnet 110 further comprises joining protrusions 232 on both magnetic poles thereof, of which an outer diameter is smaller than the inner

diameter of the opening.

63. The joining apparatus with rotatable magnet of claim 62, wherein the magnet 110 is a permanent magnet 110a of cylindrical shape.

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64. The joining apparatus with rotatable magnet of claim 56, wherein the separation preventing means 200 is a sealing lid 241 for closing the opening of the magnet installation recess 120.

10 65. The joining apparatus with rotatable magnet of claim 64, wherein a lid installation recess 242 is formed on a rim of the opening of the magnet installation recess 120, the lid installation recess 242 on which the sealing lid 241 is installed.

15 66. The joining apparatus with rotatable magnet of claim 65, wherein the magnet 110 is a cylindrical permanent magnet 110a or a spherical permanent magnet 110b.

20 67. The joining apparatus with rotatable magnet of claim 64, wherein the magnet installation recess 120 and the sealing lid 241 are formed integrally on the outer surface of the part 10, the magnet 110 is inserted after cutting the part 10, and the separation of the magnet 110 is prevented by attaching a cut piece on the part 10.

25 68. The joining apparatus with rotatable magnet of claim 67, wherein the part 10 is made of wood.

69. The joining apparatus with rotatable magnet of claim 68, wherein the magnet 110 is a cylindrical permanent magnet 110a or a spherical permanent magnet 110b.

5 70. The joining apparatus with rotatable magnet of claim 56, wherein the separation preventing means 200 is a magnet installation member 200a inserted into the magnet installation recess 120, the magnet installation member 200a comprising:
a circumferential portion 201 of which surface is in contact with the
10 magnet installation recess 120; and
a lid portion 202 that closes an upper opening of the circumferential portion 201.

71. The joining apparatus with rotatable magnet of claim 70,
15 wherein the magnet 110 is a cylindrical permanent magnet 110a or a spherical permanent magnet 110b.

72. The joining apparatus with rotatable magnet of claim 70, wherein the magnet installation member 200a further comprises a means
20 250 for fixing the magnet installation member 200a into the magnet installation recess 120.

73. The joining apparatus with rotatable magnet of claim 72, wherein the magnet installation member fixing means 250 comprises a
25 fixing wedge portion 251 extended downward of the circumferential portion 201 so as to be inserted and fixed onto the bottom surface of the magnet installation recess 120.

74. The joining apparatus with rotatable magnet of claim 72,
wherein the magnet installation member fixing means 250 comprises a
hooking protrusion 252 formed outward on an outer surface of the
5 circumferential portion 201 toward the lid portion 202.

75. The joining apparatus with rotatable magnet of claim 74,
wherein the hooking protrusion 252 is an overall hooking protrusion 252a
formed over all area of the outer surface of the circumferential portion 201
10 at a shape of a wedge.

76. The joining apparatus with rotatable magnet of claim 74,
wherein the hooking protrusion 252 is a partial hooking protrusion 252b
formed on a partial area of the outer surface of the circumferential portion
15 201.

77. The joining apparatus with rotatable magnet of claim 76,
wherein the partial hooking protrusion 252b is formed by cutting and
bending a part of the circumferential portion 201.
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78. The joining apparatus with rotatable magnet of claim 74,
wherein the hooking protrusion 252 is a lower hooking protrusion 252c
formed on a lower end area of the outer surface of the circumferential
portion 201.
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79. The joining apparatus with rotatable magnet of claim 78,
further comprising a tilted portion 253 that is tilted downward and inward

from the lower hooking protrusion 252c at a certain degree.

80. The joining apparatus with rotatable magnet of claim 79,
wherein the lower hooking protrusion 252c and the tilted portion 253 are
5 formed integrally with each other by bending a lower portion of the
circumferential portion 201.

81. The joining apparatus with rotatable magnet of claim 72,
wherein the magnet installation member fixing means 250 comprises a
10 screw thread 254 formed on the outer surface of the circumferential portion
201.

82. The joining apparatus with rotatable magnet of claim 81,
wherein the magnet installation member fixing means 250 comprises a
15 fixing tool insertion recess 255 so formed on an upper surface of the lid
portion 202 as to insert the magnet installation member 200a into the
magnet installation recess 120 by rotating the magnet installation member
200a with a magnet installation member fixing tool 260.

20 83. The joining apparatus with rotatable magnet of claim 82,
wherein the fixing tool insertion recess 255 is an insertion recess 255a
having a circular transverse section.

84. The joining apparatus with rotatable magnet of claim 83,
25 wherein a plurality of insertion recesses 255a having the circular transverse
section are formed in a radial fashion.

85. The joining apparatus with rotatable magnet of claim 82, wherein the fixing tool insertion recess 255 is an insertion recess 255b having a cross-shaped transverse section.